CLAIMS

What is claimed is:

1. A particulate filter for an exhaust system configured to manage an exhaust flow, comprising:

a housing; and

a wall-flow filtration element contained within said housing, said wall-flow filtration element having pores defining a porosity sufficient to trap exhaust particulates and to pass ash particles.

2. The particulate filter of Claim 1, wherein:

said wall-flow filtration element comprises an inlet channel with an inlet port at one end and a first end-plug at the opposite end, and an outlet channel with an outlet port at one end and a second end-plug at the opposite end;

said inlet channel being in fluid communication with said outlet channel;

said wall-flow filtration element arranged to receive the exhaust flow at said inlet port and to discharge the exhaust flow at said outlet port; and

said first end-plug having greater porosity than said second end-plug.

3. The particulate filter of Claim 2, wherein:

said wall-flow filtration element comprises a ceramic monolith structure having a plurality of porous internal walls defining said inlet and outlet channels, said inlet and outlet channels being separated by said porous internal walls to permit exhaust flow through the pores between said inlet and outlet channels.

4. The particulate filter of Claim 2, wherein the pores of said first end-plug are configured to trap exhaust particulates and permit leakage of ash particles.

5. The particulate filter of Claim 4, wherein the pore size of said first end-plug is equal to or greater than about 30 micrometers.

6. The particulate filter of Claim 5, wherein the pore size of said first end-plug is equal to or greater than about 30 micrometers and equal to or less than about 60 micrometers.

7. The particulate filter of Claim 2, wherein:

said housing comprises a first end and a second end;

said inlet port of said inlet channel being at said first end of said housing; and

said outlet port of said outlet channel being at said second end of said housing.

8. The particulate filter of Claim 3, wherein the total surface area of said first end-plug is substantially less than the total surface area of said internal walls.

9. The particulate filter of Claim 3, wherein said inlet and outlet channels and said internal walls are arranged parallel to the exhaust flow.

10. A particulate filter for an exhaust system configured to manage an exhaust flow, comprising:

a housing having a first end and a second end;

a wall-flow filtration element arranged within said housing comprising a ceramic monolith structure having a plurality of porous internal walls defining inlet and outlet channels, said inlet and outlet channels being separated by said porous internal walls to permit exhaust flow through the pores between said inlet and outlet channels;

said inlet channel comprising an inlet port at one end and a first end-plug at the opposite end and configured to receive the exhaust flow at said inlet port, said inlet port arranged at said first end of said housing;

said outlet channel comprising an outlet port at one end and a second end-plug at the opposite end and configured to discharge the exhaust flow at said outlet port, said outlet port arranged at said second end of said housing; and

said first end-plug having greater porosity than said second end-plug.

11. The particulate filter of Claim 10, wherein:

the pores of said first end-plug are configured to trap exhaust particulates and permit leakage of ash particles;

the total surface area of said first end-plug is substantially less than the total surface area of said internal walls; and

said inlet and outlet channels and said internal walls are arranged parallel to the exhaust flow.

12. A method for filtering particulates of an exhaust flow of an exhaust system, comprising:

receiving the exhaust flow at one end of a particulate filter having a ceramic monolith structure with porous walls defining inlet channels and outlet channels, the inlet channels each having an inlet port at one end to receive the exhaust flow and a porous plug at the opposite end, the outlet channels each having an outlet port at one end to discharge the exhaust flow and an end plug at the opposite end;

filtering the exhaust flow at the ceramic monolith structure as the exhaust flow passes through the porous walls between the inlet and outlet channels;

trapping exhaust byproducts at the porous walls, the end plugs, and the porous plugs, and passing ash particles through the porous plugs; and

discharging the exhaust flow at the outlet ports.

13. The method of Claim 12, further comprising:

regenerating the ceramic monolith structure and converting the trapped exhaust particulates into ash particles.

14. The method of Claim 12, wherein said trapping further comprises:

trapping ash particles at the porous walls and end plugs.

15. The method of Claim 12, wherein said passing further comprises:

passing ash particles through the porous plugs having a pore size of equal to or greater than about 30 micrometers.

16. The method of Claim 15, wherein said passing further comprises:

passing ash particles through the porous plugs having a pore size equal to or greater than about 30 micrometers and equal to or less than about 60 micrometers.

17. The method of Claim 12, wherein said receiving further comprises:

receiving the exhaust flow in a direction parallel to the inlet and outlet channels.